

## **REMARKS**

Claims 1-70 remain in the instant application. New claims 39-70 have been added by this amendment.

Reconsideration is requested of the objection to the drawings as set forth in paragraphs 1, 2 and 3 of the Office Action. Submitted herewith are new drawing Figures 2, 3, 3A, 6, 23A, 26, 27B, 29, and 32, which, together with the self-explanatory amendments to the specification, are intended to be responsive to all of the objections raised by the Examiner. It is submitted that these various changes correct the typographical errors noted by the Examiner and as a result, it is requested that the objection to the drawings be withdrawn.

Turning now to the prior art rejections, reconsideration is requested of the rejection of claims 1-7, 20, 21, 23, 24, 26 and 30 under 35 USC 102(b) as being allegedly anticipated by U.S. Patent 5,669,150 to Guertin et al. As will be explained in detail below, with respect to its teaching of measuring angles using a read head in a periodic pattern, Guertin et al is analogous to the prior art CMM disclosed in commonly assigned U.S. Patent 5,402,582 ('582) to which the present invention is intended to be an improvement upon. That is, as in the '582 patent, Guertin et al discloses a mechanism for angle measurement wherein each joint utilizes a single angular measurement sensor. With reference to Figure 5 of Guertin et al, two joints are shown, each such joint utilizing a sensor 70 or 72 with such sensor 70 or 72 comprising two parts, namely an optical read head 76, 80, an optical fringe grating 74, 78. In other words, a first joint of the CMM disclosed in Guertin et al includes a first angle measuring sensor 70 comprised of a read head 76 which communicates with a periodic optical pattern 74 while a second joint of

the Guertin et al CMM arm comprises a second sensor 72 which includes as component parts thereof a read head 80 and a periodic optical pattern 78 (which is in optical communication with the read head 80). For purposes of this analysis, it is important to note that there is no sensor 70 or 72 which is separate or distinct from the read head 76, fringe pattern 74 and read head 80, fringe pattern 78, respectively. That is, the sensor 70 is composed solely of the combination of the read head 76 and fringe pattern 74 and the sensor 72 is composed solely of the read head 80 in fringe pattern 78.

In distinct contrast, Applicants' invention represents an advance in the field of articulated arm type CMMs by providing each joint with improved angular measurement capability. This is accomplished by adding an additional measurement component to a particular joint. Recall that the prior art, such as Guertin et al and such as the '582 patent, include a single sensor for measuring angular movement comprising the combination of two elements, namely a read head in communication with a periodic pattern. In contrast, the present invention discloses and claims yet a third element in addition to the read head and periodic pattern. In Applicants' invention as recited in claim 1, this third element comprises a sensor which measures relative movement in the articulated arm with respect to the read head so as to improve the measurement accuracy of the read head. Thus, as recited in the claim 1, in a particular joint of the articulated arm, a periodic pattern and a read head are set forth wherein the read head communicates with a periodic pattern and in addition thereto, a sensor is provided which measures relative movement in the articulated arm with respect to the read head. This latter structure is simply not shown or disclosed in Guertin et al. Guertin et al simply discloses the conventional prior art measurement sensor comprising the periodic pattern and the read head. There is simply

no sensor which measures relative movement in the arm with respect to the read head as recited in claim 1.

On page 3 of the Office Action, the Examiner states that there are sensors 70, 72 in addition to the optical read heads 76, 80 and the patterns 84. However, as discussed in detail above, this is not an accurate description of the Guertin et al specification. Rather, the sensors 70, 72 are actually composed of the read head 76,80 and grating patterns 84 (that is, there is no separate sensors above and beyond the combination of the read heads and grating patterns). Thus, Guertin et al fails to disclose the important feature as recited in Applicants' claims comprising the sensor for measuring relative movement in the arm with respect to the read head. As a result, it is submitted that independent claim 1 patentably defines over Guertin et al.

In addition, it is submitted that claims 2-7, 20, 21, 23, 24, 26 and 30 which depend from claim 1 should also patentably define over Guertin et al both for depending from what should now be an allowable independent claim as well as for setting forth patentable subject matter in and of themselves. For example, there is simply no disclosure in Guertin et al of any of the important details and features of the "sensors" since there is absolutely no disclosure of such "sensors" in Guertin et al. Clearly, since Guertin et al does not even remotely disclose the addition of a sensor, then Guertin et al cannot be disclosing the important features and details of such sensors such as the fact that the sensors measure displacement (claims 3 and 4) or measure X or Y axis displacement as set forth in claims 5-7.

Based on the foregoing, it is submitted that the 35 USC 102(b) rejection based on Guertin et al should be withdrawn.

Reconsideration is also requested of the various claim rejections based on 35 USC 103 as set forth in paragraphs 8, 9, 10 and 11 of the Office Action. All of these 35 USC 103 rejections are based on Guertin et al as a primary reference. However, as discussed in detail above, Guertin et al in no way discloses, teaches or suggests the addition of the “sensor” as defined in the claims. Moreover, none of the secondary references including Eaton, Raab or Tomelleri disclose the use of such a sensor which is positioned in the same joint as a read head in periodic pattern and which measures the relative movement in the articulated arm with respect to the read head so as to improve the measurement accuracy of the read head. It is noted that while U.S. Patent 4,891,889 (‘889) to Tomelleri does disclose a proximity sensor 38, such proximity sensor is in no way used in conjunction with at least one read head whereby the proximity sensor measures relative movement in an articulated arm with respect to the read head, all of which is recited in independent claim 1.

Based on the foregoing, it is submitted that all of the claims patentably define over the references.

The allowance of claims 18 and 19 as being objected to but allowable but if rewritten in independent form is noted with appreciation.

New claims 39-70 have been added, all of these claims ultimately depend from either independent claim 1 or independent claim 37 and should be allowable together with these independent claims.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

It is submitted that the foregoing amendments should render the case in condition for allowance.

Respectfully submitted,

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## **AMENDMENT TO THE DRAWINGS**

Please replace Figures 2, 3, 3A, 6, 23A, 26, 27B, 29 and 32 with the attached revised Figures 2, 3, 3A, 6, 23A, 26, 27B, 29 and 32.